

REMARKS

Claims 1 to 19 were pending when last examined. Applicant has amended claims 1, 2, and 12. Claims 1 to 19 remain pending.

§ 102 Rejections

The Examiners rejected claims 1, 3, 5, 8, 10, and 16 to 19 under 35 U.S.C. § 012(b) as being anticipated by U.S. Patent No. 6,732,596 (“Delajoud”).

Claim 1

Amended claim 1 recites a flow meter conditioning body with (1) an elongated inlet flow section, (2) an elongated flow measurement section having a smaller cross-section than the inlet flow section, (3) a flow nozzle between the inlet flow section and the flow measurement section, and (4) a velocity sensor that extends into a space defined by the flow measurement section. Amended claim 1 further recites that the flow nozzle substantially flattens the velocity profile of the fluid at the velocity sensor.

Delajoud discloses a flow meter 1A with a main body 2, and end caps 8 and 21 mounted to the two ends of the main body. End cap 8 defines a passage 8B coupled by a flow straightener 36 to a passage defined by main body 2. In a low mass flow embodiment shown in Figs. 1A to 1G, main body 2 has an enlarged passage 4A that tapers down to a cylindrical passage 4. A heat exchanger 35 fits inside enlarged passage 4A. Note that passage 4A is not a large passage but an annular space formed between heat exchanger 35 and the cylindrical opening of main body 2 surrounding the heat exchanger, an arrangement necessary for heat exchange need for this flow meter design. A temperature probe 41 is located in the wall of main body 2 adjacent to passage 4A, and a temperature probe 42 is located in the wall of main body 2 adjacent to passage 4. Passage 4 is coupled by a flow nozzle 38 to a cylindrical passage 22 defined by end cap 21. In a high mass flow embodiment shown in Figs. 2A to 2E, main body 2 has only passage 4 and a heat exchanger 5 fits inside that passage adjacent to end cap 8. Temperature probes 12A and 12 extend into passage 4 just after heat exchanger 5. Passage 4 is coupled by a flow nozzle 16 to cylindrical passage 22 of end cap 21.

The Examiner appears to cite passage 8B of end cap 8 as the recited inlet flow section, passages 4A and 4 (collectively referred to as “passages 4”) as the recited flow measurement section, and flow nozzle 38 as the recited flow nozzle. However, flow nozzle 38 is not located between

passage 8B and passages 4 as required by claim 1. Instead, flow nozzle 38 is located after passages 4. In addition, passages 4 do not have smaller cross-sections than passage 8B as required by claim 1. Instead, passages 4 have larger cross-sections than passage 8B. Furthermore, flow nozzle 38 cannot produce a flattened velocity profile of the fluid at sensors 41 and 42 as required by claim 1 because the sensors are located in the wall of main body 2. For the above reasons, amended claim 1 is patentable over Delajoud.

Note that the flow meter described by Delajoud operates on a different principle from that of the embodiments of the present invention. The Delajoud flow meter uses a high upstream pressure to obtain sonic flow through the nozzle (forming a critical nozzle). Delajoud, col 4, line 3. As a result, this flow meter does not require a flat flow profile and does not use a velocity sensor as does the embodiments of the present invention but instead measures the upstream pressure and the fluid temperature as shown in the equations in col. 8 where the only measured variables are the fluid temperature and the upstream absolute pressure. Since the velocity is not measured, a flat profile is not needed to increase measurement accuracy.

Claim 3

The Examiner found that Fig. 1A of Delajoud discloses that flow nozzle 38 has a beta (i.e., a ratio of inlet and outlet diameters) of 0.3 to 0.7. Applicant respectfully traverses.

Claim 3 depends from claim 1 and it is patentable over Delajoud for at least the same reasons as claim 1. Furthermore, it is not possible to determine the beta of flow nozzle 38 from Fig. 1A due to the small size of the flow nozzle in the drawing. Delajoud also does not disclose if Fig. 1A is drawn to scale. For the above reasons, claim 3 is patentable over Delajoud.

Claims 5 and 8

Claims 5 and 8 depend from claim 1 and they are patentable over Delajoud for at least the same reasons as claim 1.

Claim 10

The Examiner found that Fig. 1D of Delajoud discloses an eccentric flow nozzle 38. Applicant respectfully traverses.

Claim 10 depends from claim 1 and it is patentable over Delajoud for at least the same reasons as claim 1. Furthermore, Figs. 1A and 1D generally show that the inlet and the outlet of flow nozzle 38 having coaxial longitudinal axes. For these reasons, claim 10 is patentable over Delajoud.

Claim 16

The Examiner rejected claim 16 for the same reasons as claim 1. As discussed above for claim 1, flow nozzle 38 cannot produce a flattened velocity profile of the fluid at sensors 41 and 42 (i.e., points of measurement) as required by claim 16 because the sensors are located in the wall of main body 2. Also, as pointed out in the response regarding claim 1, Delajoud does not require a flat flow profile so its design does not need to produce one. For at least this reason, claim 16 is patentable over Delajoud.

Claim 17

Claim 17 depends from claim 16 and it is patentable over Delajoud for at least the same reasons as claim 16.

Claim 18

The Examiner found that Fig. 1A of Delajoud discloses matching (1) the inside diameter of a conduit connected to the fluid flow meter conditioning body to (2) the inside diameter of the inlet section of the fluid flow meter conditioning body. Applicant respectfully traverses.

Claim 18 depends from claim 16 and it is patentable over Delajoud for at least the same reasons as claim 16. Furthermore, Fig. 1A only illustrates a tube 15A connected to flow meter 1A with a dashed line. Fig. 1A does not disclose matching the inner diameters of tube 15A and passage 8A, which was cited as the inlet flow section of the fluid flow meter conditioning body. For these reasons, claim 18 is patentable over Delajoud.

Claim 19

The Examiner found that Fig. 1A of Delajoud discloses matching (1) the inside diameter of a conduit connected to the fluid flow meter conditioning body to (2) the inside diameter of the flow measurement section of the fluid flow meter conditioning body. Applicant respectfully traverses.

Claim 19 depends from claim 16 and it is patentable over Delajoud for at least the same reasons as claim 16. Furthermore, Fig. 1A only illustrates a tube 15A connected to the flow meter 1A. Fig. 1A does not disclose matching the inner diameters of tube 15A and passages 4A and 4, which was cited as the flow measurement section of the fluid flow meter conditioning body. For these reasons, claim 19 is patentable over Delajoud.

Allowable Subject Matter

Applicant thanks the Examiner for allowing claims 12 to 15. Applicant has amended claim 12 to correct an antecedent basis error.

Applicant thanks the Examiner for indicating claims 2, 4, 6, 7, 9, and 11 are allowable if amended to independent form to include all of the limitations of the base claim and any intervening claims. Applicant has amended claim 2 into independent form. Claim 2 is now in condition for allowance. Claims 4, 6, 7, and 11 depend from claim 2 and are now in condition for allowance as claim 2 is in condition for allowance. Applicant has not amended 9 into independent form as Applicant believes its base claim 1 is patentable over Delajoud.

Summary

Claims 1 to 19 were pending. Applicant has amended claims 1, 2, and 12. For at least the above reasons, Applicants respectfully request the Examiner to withdraw the claim rejections and allow claims 1 to 19. Should the Examiner have any questions, please call the undersigned at (408) 382-0480.

I hereby certify that this correspondence is being transmitted prior to expiration of the set period of time by being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

/David C Hsia/
Signature

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Date

Respectfully submitted,

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